N2BLAST®

# FPS-1650, FPS-3250, & FPS-5000

## Fire Protection Systems - O&M Manual

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UL 508A

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South-Tek Systems

## VERSION HISTORY:

| Revision # | Implemented By | Revision Date | Approved By | Approval Date | Reason |
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| 1 | C. Cothran | 02/2018 | J. Nguyen | 02/2018 | Initial Release |
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## TABLE OF CONTENTS:

1 INTRODUCTION ..... 6
1.1 General Purpose ..... 6
1.2 About South-Tek Systems ..... 6
1.3 Audience ..... 7
1.4 Important Information ..... 7
1.5 Limits of Liability ..... 7
1.6 Service Return Policy ..... 7
2 SAFETY GUIDELINES ..... 8
2.1 General ..... 8
3 RECEIVING, UNPACKING, AND STORAGE INSTRUCTIONS ..... 10
3.1 Unpacking and Preparation ..... 10
4 SITE AND UTILITY REQUIREMENTS ..... 11
4.1 Air Supply (FPS-1650 only) ..... 11
4.2 Additional Pipings and Hosings ..... 11
4.3 Electrical Requirements ..... 11
4.4 Site Specifications ..... 11
5 PRODUCT INSTALLATION ..... 12
5.1 Installation ..... 12
5.2 Panel Layout and Gas Connections ..... 13
6 SYSTEM DESIGN ..... 14
6.1 Key Features ..... 14
6.1.1 Air Compressor (FPS-1650 only) ..... 14
6.1.2 Air Filters ..... 14
6.1.3 Programmable Logic Controller (PLC) ..... 14
6.1.4 Safety Relief Valves (SRVs) ..... 14
6.1.5 Nitrogen Tank ..... 15
6.1.6 Automatic Cut-In/Out ..... 15
6.1.7 BlastOff® Leak Detection (optional) ..... 15
6.2 Specifications ..... 15
7 SYSTEM OPERATION ..... 16
7.1 General ..... 16
7.2 Home Screen ..... 16

7.3 Dashboard ..... 17
7.3.1 SMART-Trak® Sensor Graph Logs ..... 17
7.3.2 Sensor Data Log ..... 17
7.3.3 System Performance Log ..... 18
7.3.4 Equipment Status Log ..... 18
7.3.5 N2 Leakage Log ..... 19
7.3.6 Bypass Log ..... 19
7.4 Operation ..... 19
7.4.1 Bypass Alarm ..... 20
7.4.2 BlastOff® Alarm ..... 20
7.4.3 Compressor Issue Alarm ..... 20
7.4.4 Dryer Issue Alarm ..... 21
7.4.5 Filter Issue Alarm ..... 21
7.5 Graphs ..... 21
7.6 Alarms ..... 22
7.6.1 Filter Alarm ..... 22
7.7 Product Information ..... 22
7.8 System Settings ..... 23
7.8.1 N2 Pressure Settings ..... 23
7.8.2 Sensor Calibration ..... 23
7.8.3 Bypass Settings ..... 24
7.9 Maintenance ..... 24
7.9.1 Valve Control ..... 25
7.9.2 Alarm Contacts ..... 25
7.9.3 Filter Maintenance ..... 25
7.10 Alarm Settings ..... 26
7.10.1 General Alarm Settings ..... 26
7.10.2 O2 Purity Alarm Settings ..... 26
7.10.3 BlastOff® Settings ..... 26
7.10.4 N2 Pressure Alarm Settings ..... 27
7.10.5 Bypass Alarm Settings ..... 27
7.10.6 Equipment Status Settings ..... 27

7.11 Communication Settings ..... 27
7.11.1 Network Communications (PC) ..... 28
7.11.2 Network Communications (PLC) ..... 28
7.11.3 Network Communications Status ..... 28
7.12 Factory Settings ..... 28
8 START-UP PROCEDURES ..... 29
8.1 Start-Up Procedures ..... 29
8.2 Checking For Leak ..... 30
8.2.1 N2 Generator or Tank Leaks ..... 30
8.2.2 Leaks Within the Cabinet ..... 30
9 SYSTEM MAINTENANCE ..... 31
9.1 Air Pre-Filter (FPS-1650 only) ..... 31
9.2 Air Filter Replacement ..... 32
10 KEY CONTACTS ..... 34
11 FAQS ..... 35
11.1 Power Issues ..... 35
11.2 Pressure Issues ..... 35
11.3 Gas Leaks ..... 35
APPENDIX A: WARRANTY ..... 36

# 1 INTRODUCTION

## 1.1 GENERAL PURPOSE

This manual provides proper installation and use of South-Tek Systems ***N2-BLAST®*** FPS-1650, FPS-3250, and FPS-5000 only. South-Tek Systems is not responsible for damages when using this in manners not approved by South-Tek Systems. The user(s) of this document should confer any questions with a qualified South-Tek Systems representative on its commissioning and correct use.

Please contact South-Tek Systems with any question or concerns at:

South-Tek Systems, LLC
2940 Orville Wright Way Ste 600
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Tel: (888) 526-6284

Email: Info@southteksystems.com
http://www.southteksystems.com/

This document is based upon the R&D performed by the South-Tek Systems Engineering Team.

**WARNING: The installer and the user should read this manual in its entirety.**

## 1.2 ABOUT SOUTH-TEK SYSTEMS

South-Tek Systems, founded in 1997, is a nitrogen generator manufacturer designing nitrogen generators for worldwide distribution. Why not produce nitrogen at your facility for a fraction of the cost versus endlessly paying for bulk liquid or delivered gas cylinders? We make a full line of nitrogen generator including:

- The N2 GEN® Series Nitrogen generators for use in various industrial and lab applications. 50,000 SCFH unit.
- The BeerBlast™ - Mixed Gas Dispense System Increases profits, removes over or under carbonation, and improves all-around taste and draft beer quality.
- The ***N2-BLAST®*** - Corrosion Inhibiting System effectively arrests electrochemical, galvanic and micro-biologically influenced corrosion (MIC) by introducing 98.5% pure nitrogen into dry and pre-action sprinkler systems.

With purities ranging from 95% up to 99.999%, we provide nitrogen generators that are sure to suit your needs. For more information about our complete nitrogen generator capabilities, please visit our website at www.southteksystems.com.

## 1.3 AUDIENCE

This manual is for Installer/Supervisory staff. Read entire manual before operating. Contact the local provider for any operation and maintenance questions before contacting the manufacturer.

## 1.4 IMPORTANT INFORMATION

All personnel (and their supervisors) installing, operating, and maintaining the ***$N_2$-BLAST®*** must read and fully understand this manual prior to installing, operating or performing maintenance.

The ***$N_2$-BLAST®*** produces nitrogen ($N_2$) at a low flow rate, which quickly dissipates into the air. $N_2$ gas is not poisonous, but do not directly inhale, since high concentrations can cause asphyxiation. Install the unit in a well ventilated room that is not sealed off from normal living space air changes.

All personnel involved with installation, operations, and maintenance of the ***$N_2$-BLAST®*** must follow safe working practices, including OHSA and local health/safety code regulations.

## 1.5 LIMITS OF LIABILITY

Buyer's exclusive remedy for all claims shall be for damages, and seller's total liability for any and all losses and damages arising out of any cause whatsoever including, without limitation, defects in or defective performance of the system, (whether such claim be based in contract, negligence, strictly liability, other tort or otherwise) shall in no event exceed the purchase price of the system in respect of which such cause arises or, at seller's option, the repair or replacement of such; and in no event shall seller be liable for incidental, consequential or punitive damages resulting from any such cause.

Seller shall not be liable for, and Buyer assumes all liability for, the suitability and the results of using nitrogen by itself or in any manufacturing or other industrial process or procedure, all personal injury and property damages connected with the possession, operation, maintenance, other use or resale of the System. Transportation charges for the return of the System shall not be paid unless authorized in advance by Seller.

**NOTE: Any MODIFICATIONS made by the customer without the written consent of South-Tek Systems will void the product's warranty.**

## 1.6 SERVICE RETURN POLICY

Follow these procedures to return the system when performing site repairs is not possible:

- The owner must get a Return Material Authorization number, which references the model and serial, from South-Tek Systems. South-Tek Systems will not accept any items for service or credit without written authorization from South-Tek Systems.
- Return all items with the original packaging material if possible. Package all items for safe return to South-Tek Systems. South-Tek Systems will not be responsible for damages, which occur in transit. Damages occurred from failing to adhere to these procedures will be the customer's responsibility. Contact South-Tek Systems for a return shipping address.
- Shipping charges must be prepaid on all returns.

# 2 SAFETY GUIDELINES

The following section outlines the basic safety considerations about installation and operation of the ***$N_2$-BLAST®*** FPS-1650, FPS-3250, and FPS-5000. For other equipment used with the nitrogen generator, such as air compressors, and dryers, refer to the manufacturer's safety guidelines.

## 2.1 GENERAL

Using the FPS-1650, FPS-3250, and FPS-5000 correctly is important for safety and trouble-free operation. Wrong use can cause damages to the system or can lead to incorrect gas supply. The nitrogen generator produces nitrogen at a low flow rate, which quickly dissipates into the air. Nitrogen is not poisonous, but do not directly inhale, since high concentrations can cause asphyxiation.

**Warning: Install the unit in a well-ventilated room, one that is sealed off from normal living space air changes.**

Read carefully and act accordingly before installing, operating, or repairing the unit:

- Operator must use safe working practices and rules when running the nitrogen generator.
- The owner is responsible for always keeping the unit in safe working conditions.
- Always use approved parts when performing maintenance and repairs. Make sure that replacement parts meet or exceed the original parts' specification.
- Only competent individuals, train and authorized, can install, operate, perform maintenance, and repair.
- Isolate incoming and outgoing pressures to the generator, and depressurize the service or repair section before performing any mechanical work, including changing the filters. Vent the nitrogen generator's exhaust gas outside or to a large, well-ventilated room to avoid suffocation due to lack of oxygen.
- Wear safety glasses if the cabinet door is open while the machine is running.
- Use ear protection when the equipment is running.

**WARNING: Components may experience pressure during operation. Pressurized gases are dangerous and may cause injury or death if handled or used inappropriately.**

- **Never allow pressurized gas to exhaust from an unsecured hose. An unsecured hose may present a whipping action, which can cause serious injury. If a hose burst during use, immediately close all isolation valves if safe and turn off the unit.**
- **Never disable or bypass any safety relief valves.**
- **Always disconnect the nitrogen generator the supply power prior to performing electrical work.**

**NOTE: Always follow local and site safety regulations in conjunction with this manual. Correct use of the nitrogen generator is important for personal safety. Incorrect safety practices can cause damage to the individual and equipment.**

Follow safe working practices, OSHA, and local health and safety regulation when installing and maintaining the ***$N_2$-BLAST®*** FPS-1650, FPS-3250, and FPS-5000.

**WARNING: Read the manual before installing and operating the nitrogen generator to prevent accidents and damages.**

- **Contact the supplier for questions not answered in this manual.**
- **Only use the FPS-1650, FPS-3250, and FPS-5000 for the designed purpose.**
- **Only qualified service-engineers may work on installation, maintenance and repairs.**
- **Unqualified people should not work on the equipment.**
- **Do not tamper or experiment with the equipment or exceed the technical specifications.**

# 3 RECEIVING, UNPACKING, AND STORAGE INSTRUCTIONS

## 3.1 UNPACKING AND PREPARATION

The ***$N_2$-BLAST®*** FPS-1650, FPS-3250, and FPS-5000 will arrive in a wooden crate. Open the side labeled "Open Side" to identify and verify all parts listed on the packing list are present and undamaged. South-Tek Systems (STS) is not responsible for damages that occur during shipping and handling of the ***$N_2$-BLAST®***. Document any visual damages and report them to the responsible shipping company, and then, contact STS at (888) 526-6284 to assess the damages.

**Until Installation:**

- Store the ***$N_2$-BLAST®*** in a dry and climate controlled (60-80° F) room.
- Always keep ***$N_2$-BLAST®*** in an upright position or in crate as shipped.
- Read entire manual and make all connections (per instructions) before connecting power.
- Keep all gas lines dry so moisture does not enter generator on hook-up.
- Never place or stack objects on top of the ***$N_2$-BLAST®***.

Removing the nitrogen generator from the crate requires unbolting it from the crate. Carefully, lift the unit out and set it on the floor. Use a floor jack to move it to the final location.

**Note: For the FPS-1650, remove the 4 painted bolts below the cabinet to free up the compressor's vibration isolators.**

Carefully, break down the crate and store in a safe location. Save and reuse the crate if returning unit for factory service.

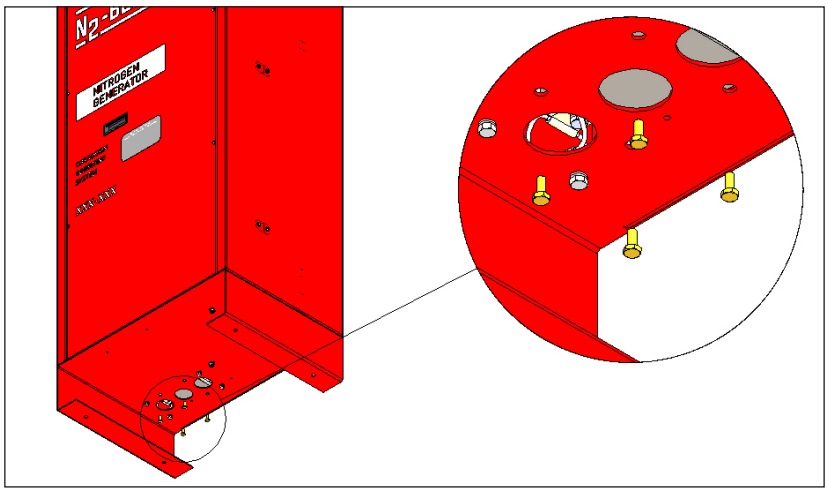



***Figure 1: Hardware Removal for FPS-1650 only***

# 4 SITE AND UTILITY REQUIREMENTS

## 4.1 AIR SUPPLY (For FPS-3250 and FPS-5000 models only)

**Note: N2-BLAST® FPS-1650 models have integrated compressor with acceptable air filtration**

Keep the nitrogen generator's air supply between 40-100° F (4-38° C) and a dew point < 40° F (4° C). Exceptions are available for custom designed units. Air supply that does not meet these requirements may cause damages not covered by warranty. Other equipment, such as the air dryer and pressure vessels, must meet minimum design specifications to function properly. Contact South-Tek Systems or the local installer for questions about air supply requirements.

The nitrogen generator's incoming minimum and maximum air pressure is 100 PSIG and 125 PSIG, respectively, unless otherwise configured. Set the incoming air pressure at the design air in pressure to meet purity and flow specifications. Operation at other pressures may result in unwanted performance and damages to the generator's components. Air consumption depends on nitrogen product purity and flow rate. Please consult South-Tek Systems for specific details.

## 4.2 ADDITIONAL PIPING AND HOSINGS

Sourcing and installing additional plumbing, supplied by other manufacturers, must meet all of the unit's flow, pressure, and temperature requirements. The max feed air at system's pressure can be up to 3 times the specified average feed air flow-rate. Consider all incoming feed air flow-rate references on the nitrogen generator as average feed air unless otherwise noted. If piping length from the air receiver is greater than 50 feet, consult with a piping contractor for proper line size.

## 4.3 ELECTRICAL REQUIREMENTS

The ***$N_2$-BLAST®*** FPS-1650, FPS-3250, and FPS-5000 requires 120-240VAC / 50-60hz / 1ph. The FPS-1650 draws < 8A, the FPS-3250 and FPS-5000 draws < 5A. They have a built in 20A over-current protection device and comes with a standard 3-prong US power cord for the electrical connection (unless otherwise specified). They comes with UL 508A ICP certification, and the electrical schematic are available upon request.

## 4.4 SITE SPECIFICATIONS

Unless designed otherwise, install in a nonhazardous indoor location with temperatures between 40-100°F (4°- 38°C). For ease of maintenance, troubleshooting, and minimizing pressure drop, install the equipment in the same area. Leave enough space around the generator and other equipment for routine maintenance.

# 5 PRODUCT INSTALLATION

## 5.1 INSTALLATION

Install the ***N2-BLAST®*** FPS-1650 on a hard, flat surface supporting 300+ lbs. To secure the unit to the floor, use the four anchor bolt-holes on the support legs. Anchoring is not required, but follow site and local codes for securing equipment.

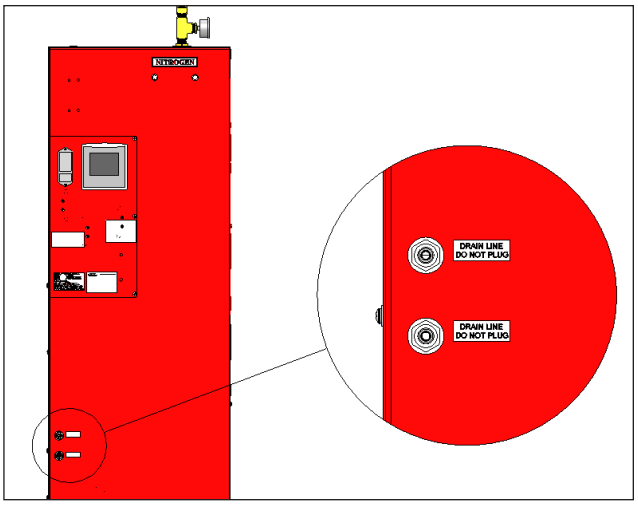



***Figure 2: FPS Nitrogen Generator Drain Ports***

The recommended clearance on the front and side is 36" for maintenance and 6" minimum on all sides for ventilation. Keep in mind, the user touch screen is on left side and performing routine maintenance is from the front door. Leave enough clearance room on the top of the cabinet for gas line connections.

The FPS-1650 has two ¼" OD drain ports on the cabinet's left side. The FPS-3250 and FPS-5000 have two ¼" NPT ports on the cabinet's left side. Plumb these drain lines individually to the nearest site drain and leave open to atmosphere for proper drainage.

See below for basic setup. Refer to the general arrangement drawing included with the installation package for detailed instructions.

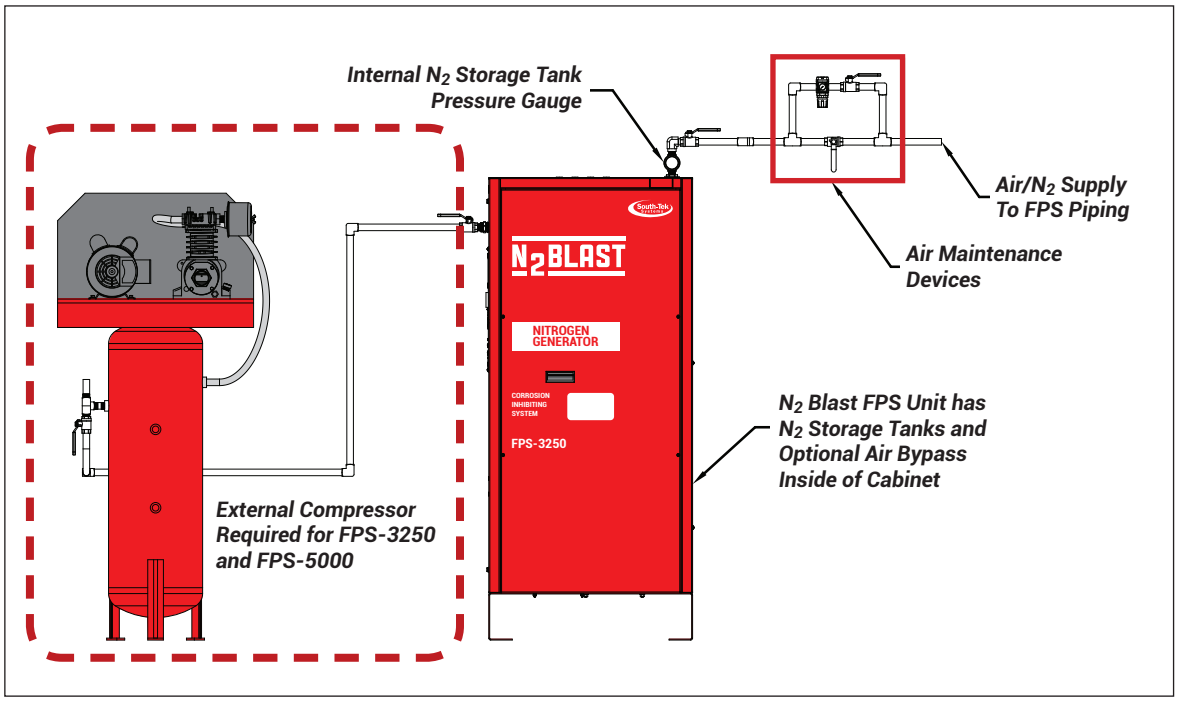



***Figure 3: FPS Nitrogen Generator Installation set-up***

## 5.2 PANEL LAYOUT AND GAS CONNECTIONS

See figure below for panel layout and gas connections. Double-check all connection locations before turning on or opening any valves.

**Note: All N2-BLAST® models come with ½" NPT Female connections unless otherwise stated**

| EXTERNAL COMPONENTS | | |
|---|---|---|
| **ITEM#** | **DESCRIPTION** | **SERVICE** |
| 1 | 1/2" FNPT BALL VALVE | AIR INLET |
| 2 | 1/2" FNPT BALL VALVE | N2 OUT |
| 3 | 0 - 160 PSIG PRESSURE GAUGE | INTERNAL STORAGE TANK PRESSURE |
| 4 | 1/4" OD PTC COUPLING | FILTERS DRAIN LINE CONNECTION |
| 5 | UNITRONICS ELECTRICAL ASSEMBLY | SYSTEM CONTROLLER (PLC) |
| 6 | POWER ENTRY MODULE, 20 AMP | SYSTEM MAIN POWER CONNECTION |
| 7 | UL 508A OPEN INDUSTRIAL PANEL | ELECTRICAL CONNECTIONS |
| 8 | UL 508A OPEN INDUSTRIAL CONTROL PANEL CERTIFICATION LABEL | |
| 9 | ELECTRICAL PANEL AND TERMINAL BLOCK TORQUE SPECIFICATIONS LABEL | |
| 10 | PRODUCT SERIAL NUMBER LABEL | |
| 11 | BUZZER AND DISPLAY SCREEN WARNING INFORMATION LABEL | |
| 12 | NITROGEN GENERATOR INFORMATION LABEL | |

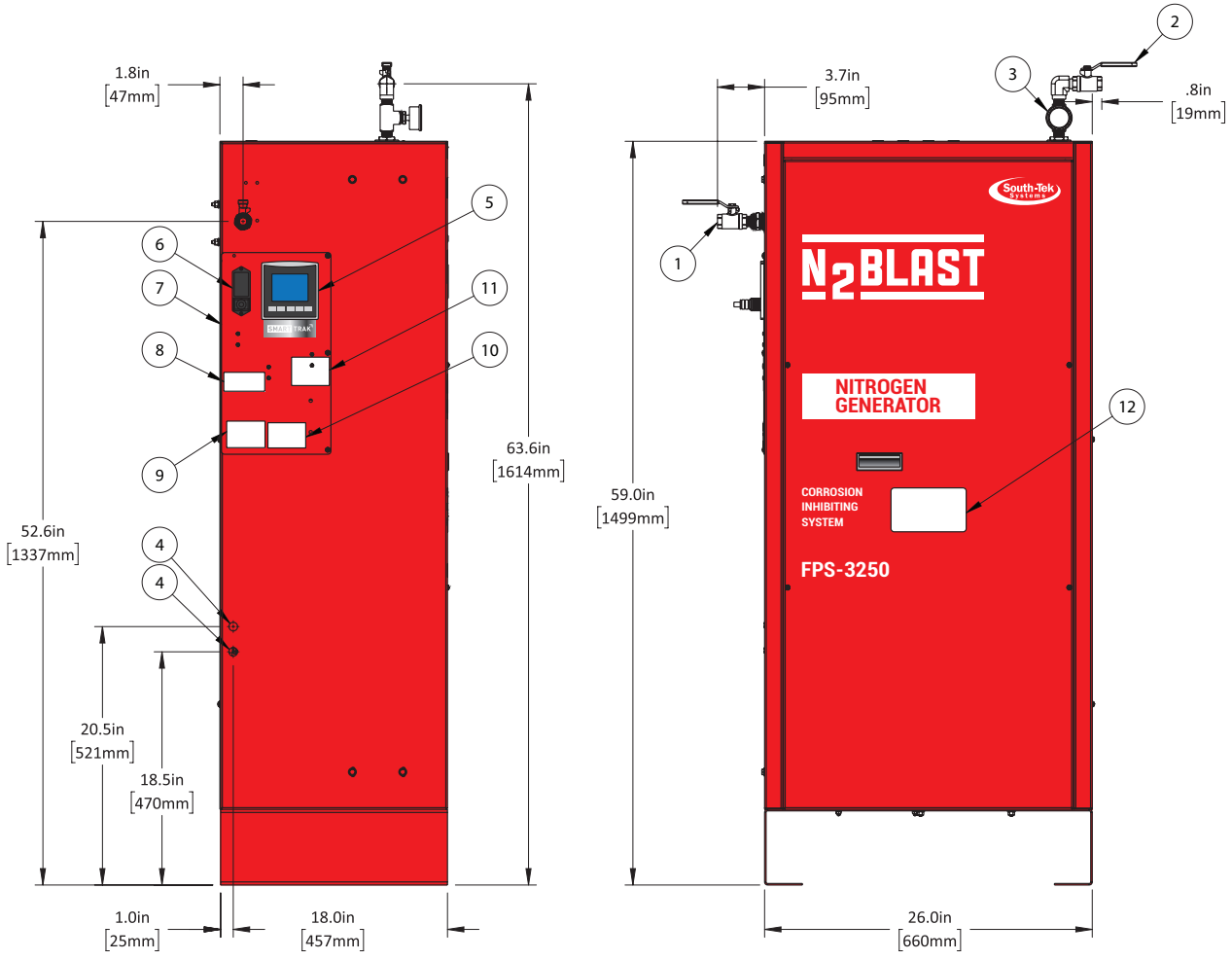



***Figure 4: FPS Nitrogen Generator Dimensions and Connections***

# 6 SYSTEM DESIGN

## 6.1 KEY FEATURES

The ***$N_2$-BLAST®*** FPS-1650, FPS-3250, & FPS-5000 key features include the following:

- Internal Air compressor (FPS-1650 only)
- Safety Relief Valves
- Air Filters
- Automatic Pressure Cut-in/Cut-out
- Programmable Logic Controller (PLC)
- Nitrogen Tank
- Pressure Swing Adsorption Beds
- STS Patented Blast Off® (optional)

### 6.1.1 Internal Air Compressor (for FPS-1650 only):

An oil-less internal air compressor has an engineered dampening system reducing vibration and noise throughout the cabinet. The air compressor has a pre-filter to catch small particulates that can cause damage. The recommended replacement for the pre-filter is 1000 run hours or 1-year, whichever comes first. Dirtier environments may need more frequent changes. Consult with the supplier for a different filter maintenance schedule if installing in a dirty environment.

### 6.1.2 Air Filters:

The generators have two filters between the compressed air and $O_2$ separation beds - the particulate and coalescing. The FPS-1650 has an air inlet pre-filter, and the FPS-3250 and FPS-5000 will have an additional absorbing filter. The 5 micron particulate filter catches the bulk particles, and the 0.1 micron coalescing catches the remaining smaller particles. Both filters feature an auto-drain that drains any water buildup within the filter housing. These FPS-1650 drain lines are on the cabinet's lower left side. The FPS-3250 and FPS-5000 drain lines are on the cabinet's bottom. Connect these drain lines to a safe location. The FPS-3250 and FPS-5000 absorbing filter does not require drain plumbing because it does not have an auto-drain.

### 6.1.3 Programmable Logic Controller (PLC):

An integrated PLC within the cabinet, features smart and efficient coding to maximize the generator's performance. It controls the valve timing and sequencing to move compressed gas throughout the system. It also has a smart feature to automatically switch between different "modes" based on the current run stages. (See **Chapter 7: System Operation** for more about the unit's functionality).

### 6.1.4 Safety Relief Valves:

The installed ASME safety relief valves adds additional safety to protect component failures.

### 6.1.5 Nitrogen Tank:

A nitrogen tank inside the cabinet comes with ball valves, safety relief, and a gauge. The outlet gas connects to an external manual ball valve for easy plug and play connection.

### 6.1.6 Automatic Cut-In/Out:

The generator starts and stops based on an analog signal to the PLC from the built-in pressure transducer. Do not adjust the factory preset cut-in and out pressure without first consulting with South-Tek Systems.

### 6.1.7 Patented Blast Off® Detection (optional):

The "BlastOff® Leak Detection" is a patented feature which sends an alarm if it detects a possible gas leak. The alarm signal can be an audible, visual, and dry contact connection to the "Building Management System's (BMS)". Power cycle the unit to reset the alarm, but avoid doing this multiple times without finding the cause as it will shorten the generator's life.

## 6.2 SPECIFICATIONS

***Table 1: FPS Nitrogen Generator Specifications***

| *$N_2$-BLAST®* FPS-1650, FPS-3250, & FPS-5000 – Specifications | |
|---|---|
| Nitrogen Purity | 98.5+% |
| Installation | Floor standing |
| Display | Hours / Run / Standby / Filter Alarm / Blast Off® |
| N2 Storage Pressure | 60-75 PSIG |
| Cabinet Port Connections | 1/2" NPT Female |
| Electrical | 110-220VAC / 50-60 Hz / 1Ph / FPS-1650 < 8 A, FPS-3250/FPS-5000 < 5A |
| Compressor | (for FPS-1650 only) Integral / Oil-Free |
| Ambient Temp. | 40° to 100°F |
| Noise Level (dbA) | < 90 dbA |
| Size | 26" W x 18" D x 59" H (Cabinet Dimensions) |
| Weight (lbs.) | Approx: FPS-1650(223) FPS-3250(243) FPS-5000(303) |

# 7 SYSTEM OPERATION

## 7.1 GENERAL

South-Tek Systems' proprietary program controls the valve sequencing to produce nitrogen. The design meets specifications of a fire protection system. Consult with South-Tek System for written approval before performing any field changes or customization. Unauthorized changes voids all warranties and may cause damages or malfunctions to the system.

This section describes the major control functions and instrumentations associated with the nitrogen generators. All programs are proprietary and password protected from the factory. Do not alter any controls or instrumentations. Changes without South-Tek Systems' written consent voids the performance specifications.

**Note: This section does not included the controls for supporting equipment, such as the compressor and dryer. Please consult the original manufacturer's manual for further information.**

## 7.2 HOME SCREEN

The home screen displays menu that navigates the user to different program screens. The first page allows access to the following screens: Dashboard, Operation, Graphs, Alarms, Production Info, and Next Screen. The "Next" screen allows access to the following screens: Previous Screen, System Settings, Maintenance, Alarm Settings, Communication Settings, and Factory Settings. Printed on the manual's second page is the user password which allows access to certain screens.

The home screen also has a Start and Stop button to start and stop the generator. Hold the button for 1-second to change state. The status indicator next to the Start and Stop button shows "Hold" for 1-second and then change states from "Off" to "Running" or vice versa.

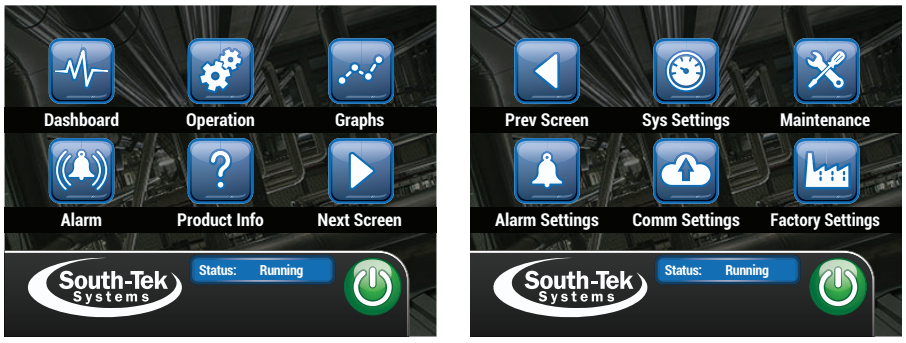



***Figure 5: HMI Home Screens***

## 7.3 DASHBOARD

This screen provides the operator with the basic statistics of the nitrogen generator. The large gauge on the screen displays the nitrogen pressure in the nitrogen tank. Below the gauge is a digital hour meter logging the overall run hours of the nitrogen generator. The right side displays the "$N_2$ Leakage Averages". It shows the last, current day, and monthly nitrogen leakage (in SCFH) of the fire protection system.

The SMART-Trak® button navigates to another menu, and the system status bar shows system status.

***Figures 6: Dashboard Screen***

### 7.3.1 SMART-Trak® Menu

The Smart-Trak button brings up the following other data tracking capabilities: Sensor Graphing, Sensor and Data Log, System Performance Log, Equipment Status Log, $N_2$ Leakage Log, and Bypass Log. The user can scroll through the different choices using the left upper and lower arrows.

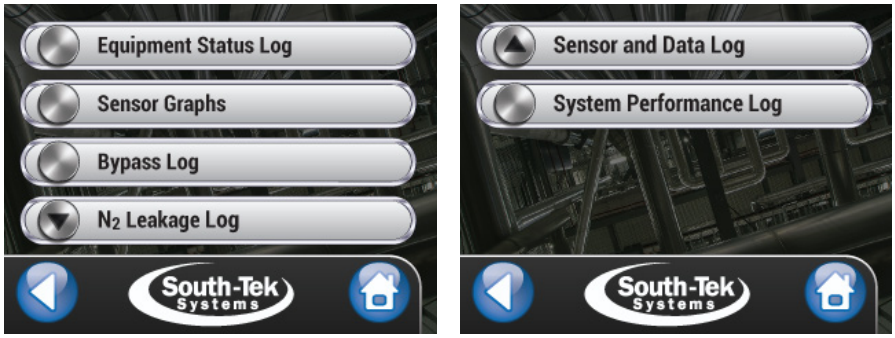



***Figure 7: SMART-Trak® Screens***

### 7.3.2 Sensor Data Log

This provides detail sensor data installed with the unit. The nitrogen pressure transducer comes standard. Additional sensors includes - airflow meter, nitrogen flow meter, oxygen sensor, and air in temperature sensor. The data log tracks current, average, max, and minimum when selecting both the "Start" button and the nitrogen generator starts a new cycle. Press the "Stop" button to stop logging, and press the "Reset" button to reset the data. The "SD Card" button brings up "Start" micro SD card data logging option. To start the logging, press the "Start" button and press the "Stop" button to stop the data collection. Before removing the micro SD card, press the "Eject" button and wait until the status indicates that it is safe for removal.

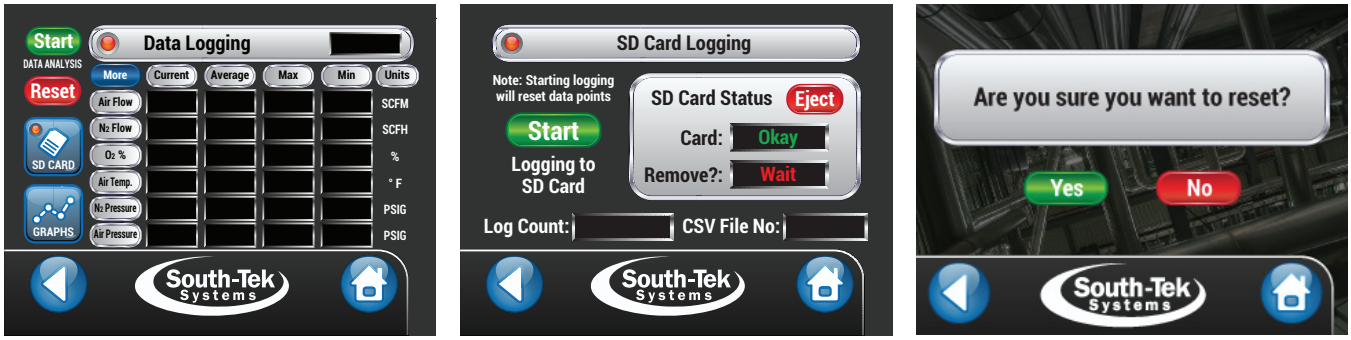



***Figure 8: Sensor Data Logging Screens***

### 7.3.3 System Performance Log

This feature tracks the system performance based on user input time. It continues to collect data until the user turns off the logging. It collects the following data: Start Date, End Date, Total Run hours, Total Cycles, Total Air Flow[1], Total $N_2$ Flow[1], Air/N2 Ratio[1], Average O2%[1], Average O2 PPM[1], Average Air Pressure[1], and Average $N_2$ Pressure.

**Note1: This data collection is possible with optional sensors installed. Contact South-Tek Systems for further details.**

Start the "System Performance Log" by going to the setup page. Enter the test duration and press the "Start Performance Log" button (the icon will turn green). Reset the current data or entire "System Performance Log" by pressing the "Reset" button. A confirmation screen pops up before permanently deleting the data. An example of how the "System Performance Log" works: A "Test Duration" of 7 days monitors and records data for 7 days. After 7 days, it logs the final values and starts a new 7 day log. This cycle continues repeating itself every 7 days until stopping the "System Performance Log". This allows the user to compare historical data and monitor performance trends of the system.

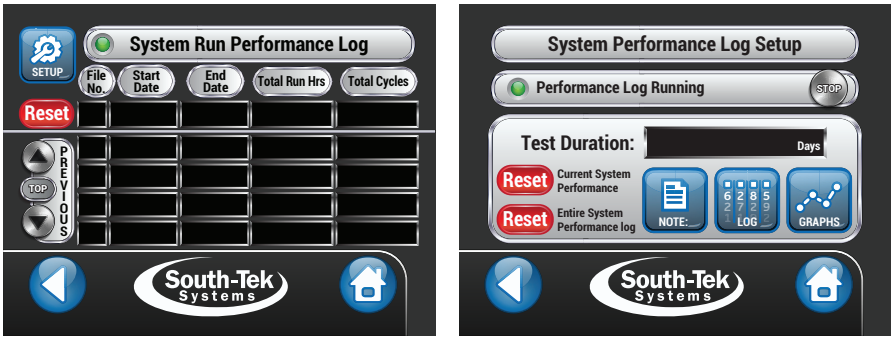



***Figure 9: System Performance Log Screens***

### 7.3.4 Equipment Status Log

The "Equipment Status Log" screen logs every equipment alarm instances (i.e. - air compressor, dryer, or nitrogen generator alarm). It logs the date, time, and notes which equipment triggered an alarm. Use the scrolling feature to scroll through the history. The data can be reset by pressing the "Reset" button. A confirmation screen pops up before permanently deleting the data.

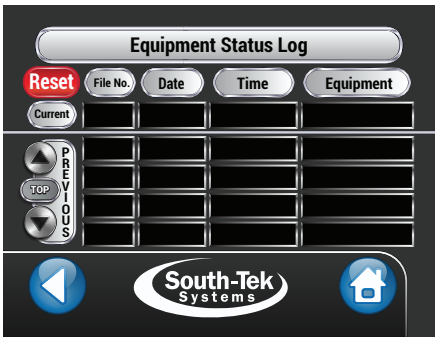



***Figure 10: Equipment Status Log Screen***

### 7.3.5 $N_2$ Leakage Log

The "$N_2$ Leakage Averages", on the right of the screen shows three system leakage averages in SCFH - last measured, current day, and current month. By pressing the "$N_2$ Leakage Average button", it brings up more options to turn on/off the logging, view monthly log, and reset the data.

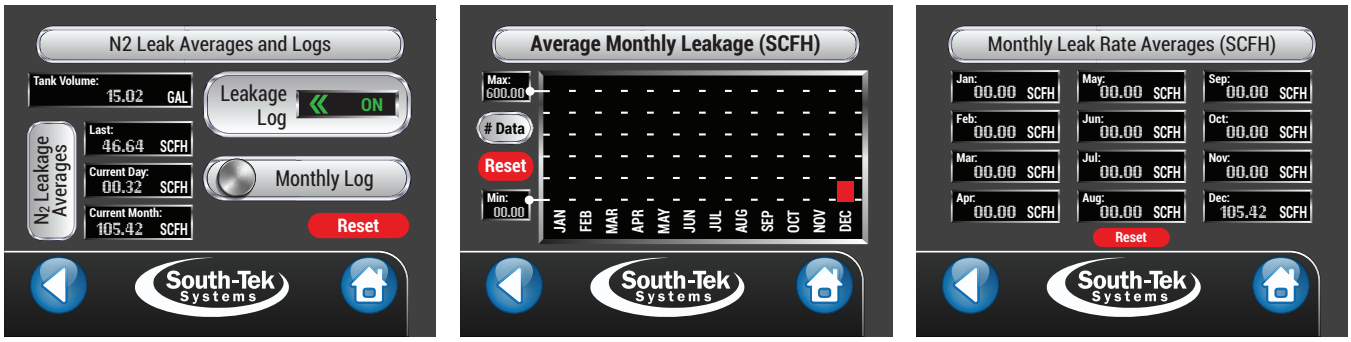



***Figure 11: $N_2$ Leakage Log Screens***

### 7.3.6 Bypass Log

The "Bypass Log" screen provides a log of every instances of the system being in "Bypass" mode. It logs the date, time, and duration of the bypass mode. Use the scrolling feature to scroll through the history. The data can be reset by pressing the "Reset" button. A confirmation screen pops up before permanently deleting the data.

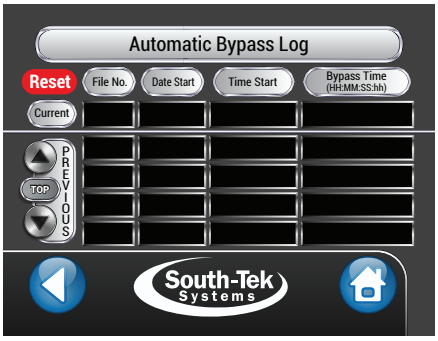
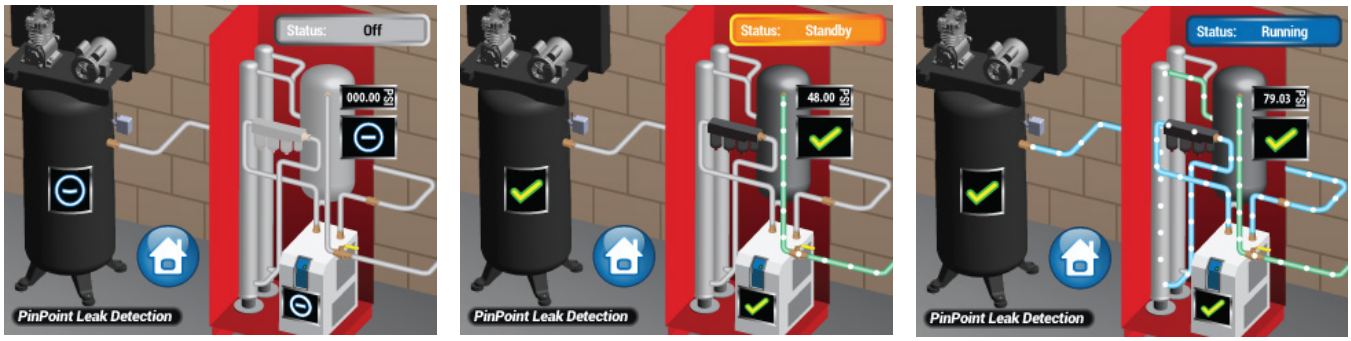



***Figure 12: Automatic Bypass Log Screen***

## 7.4 OPERATION

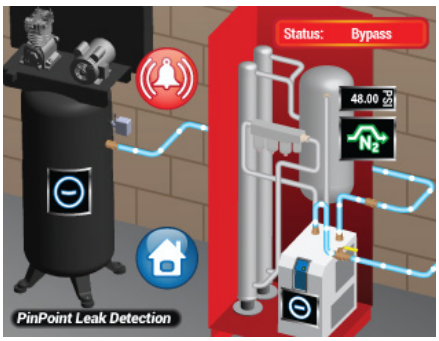
The following images display the "Off", "Standby", and "Running". A status icon on each equipment indicates the status. The check mark [✓] indicates the equipment working properly where a warning symbol [⚠] indicates an issue. Gas flow animation with small white blips travels along the appropriate path (Air = Blue; $N_2$ = Green). After initial alarm, all alarm screens will time-out and revert to this operation screen. Gray piping with no animation mean no moving gas. The alarm triggered is displayed in the upper right corner "Status Bar".




***Figures 13: (Operation Modes) Off, Standby, and Running Screens***

### 7.4.1 Bypass Alarm

During the 30 minute fire protection piping system fill test, or if the generator is not functioning correctly, the "Bypass Alarm" triggers. This generator automatically switches over to the external air compressor. This bypasses nitrogen production until the fire protection piping system no longer demands the increased gas flow. Press the red bell icon to temporarily silence the buzzer. The generator will automatically return to normal nitrogen operation.




***Figures 14: Bypass Mode Screen***

### 7.4.2 BlastOff® Alarm

The system activates a BlastOff® Alarm when it detects potential leaks or nitrogen being overdrawn. The operation screen will appear and with a status notification in the upper right corner flashing "BlastOff". Press the red bell icon to temporarily silence the buzzer. Inspect and test the system for leaks and component failures. Contact South-Tek System or your local installer for further troubleshooting.

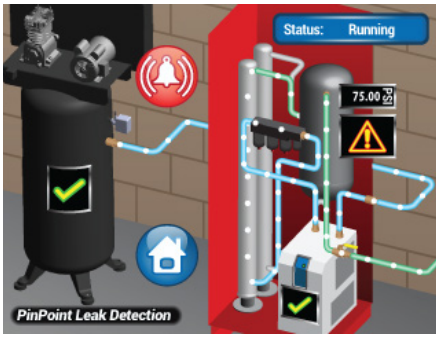



***Figure 15: BlastOff® Mode Screen***

### 7.4.3 Compressor Issue Alarm

When the nitrogen generator detects an issue with the air compressor, it will jump to the operation screen and display a warning symbol on the air compressor. Press the red bell icon to temporarily silence the buzzer. Check the air compressor for power, line leaks, or other equipment failures in order to get the nitrogen generator running properly again. Contact South-Tek System or the local installer if further troubleshooting.

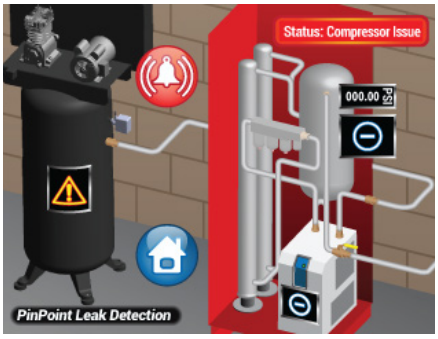



***Figure 16: Compressor Issue Screen***

### 7.4.4 Dryer Issue Alarm

When the nitrogen generator detects an issue with the air dryer, it will jump to the operation screen and display a warning symbol on the air compressor. Press the red bell icon to temporarily silence the buzzer. Check the air dryer for power, line leaks, or other equipment failures in order to get the nitrogen generator running properly again. Contact South-Tek System or the local installer if further troubleshooting.

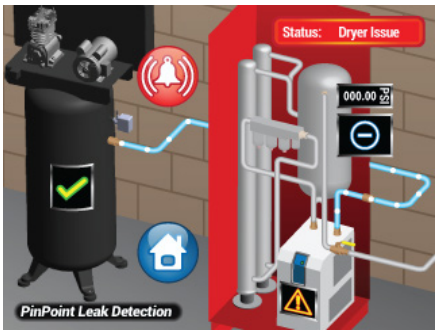
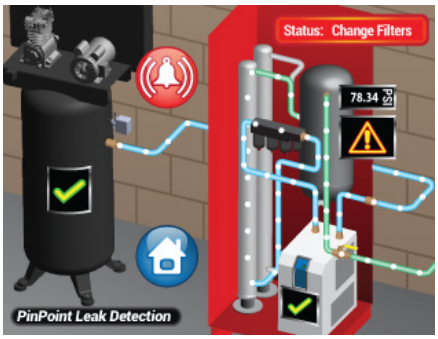



***Figure 17: Dryer Issue Screen***

### 7.4.5 Filter Issue Alarm

The nitrogen generator will trigger a filter alarm after 1 year (calendar days) or after 1000 hours of run time, whichever occurs first. When this happens, it will jump to the operation screen and display a warning symbol on the nitrogen generator with a status message in the right corner flashing, "Change Filters". The system continues running, but change out the filters as soon as possible. After changing the filters, reset the filter alarms to clear the maintenance alarm. Contact South-Tek System or your local installer if further troubleshooting.




***Figures 18: Filter Alarm Screen***

## 7.5 GRAPHS

The graph button brings up historical data of the sensors included with the generator. Every generator includes a nitrogen storage pressure transducer; therefore, every unit trends the tank pressure. Other optional graphing displays may include, air-in flow, nitrogen out flow, nitrogen dew point, and incoming air temperature. The user can adjust the "Y-Axis" scale (pressure reading range) by adjusting the minimum and max values. Press the box and a numerical keypad will appear. Enter the desired values and press enter. The graph automatically adjusts to the minimum and max values.

The "M" button is for scrolling through the history and the "G" button brings up horizontal grid lines. Press the "Next" button to go to the next graph, or press the "Home" button to return to the home screen.

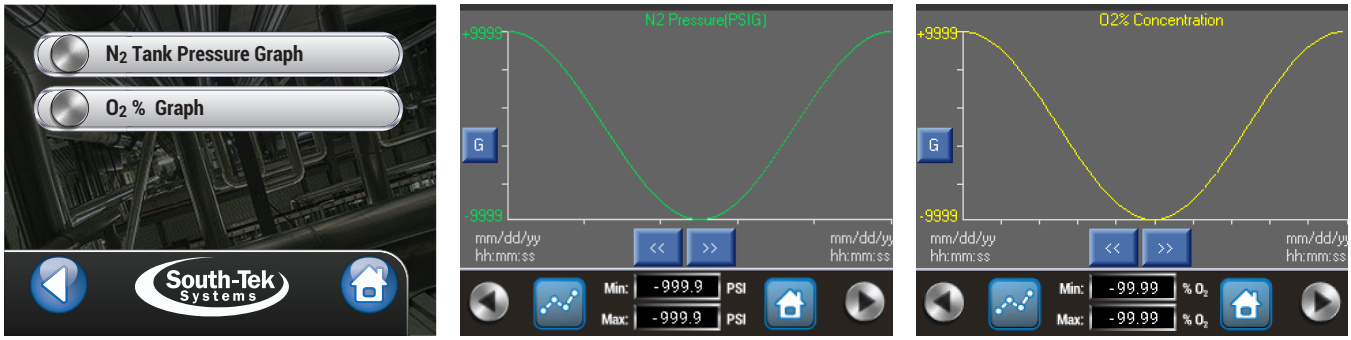



***Figure 19: Graphical Trending Options ($O_2$ Sensor is an optional feature)***

## 7.6 ALARMS

The alarm button on the Home Screen, allows the user to quickly review the status of all the alarms - the Nitrogen Pressure, Nitrogen Purity, BlastOff®, Bypass, and Equipment Status Alarm. If the status window displays this symbol, [**»**], the user can press that button to bring up additional information regarding that alarm.

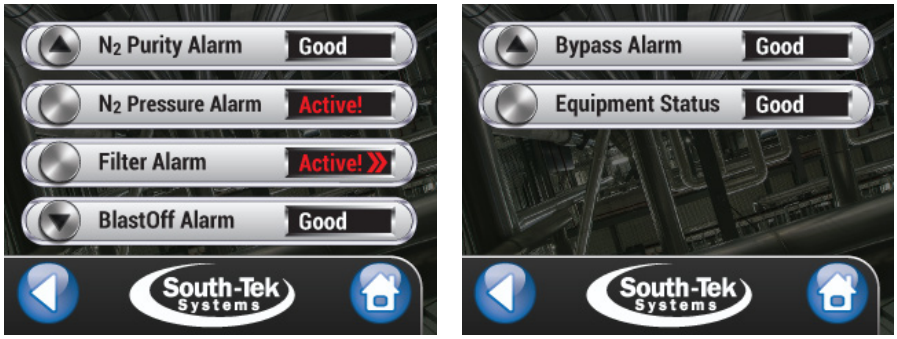



***Figure 20: Alarm Menu Screens ($O_2$ Purity with presence of $O_2$ Sensor)***

### 7.6.1 Filter Alarm

With an active filter alarm, pressing the [ **Active »** ] button brings up more details - the Filter Replacement Kit # (FRP#), individual filter numbers, last change date, filter status, and replacement contact information. After changing out filters, the user can press the "Change Filters" button, and then hold the reset button to acknowledge the filter change.

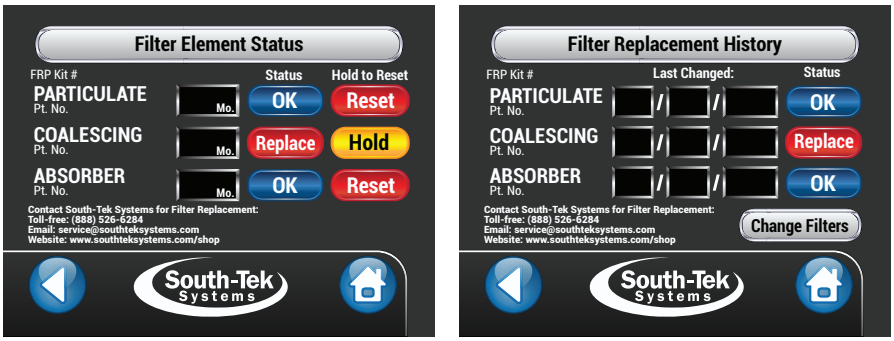



***Figure 21: Filter Status and Filter History Screens***

## 7.7 PRODUCT INFORMATION

The user can find the basic registration information – serial number, manufacturing date, commission date, and software version on the "Product Information" screen. Also displayed is South-Tek Systems' contact for any questions regarding proper operation.

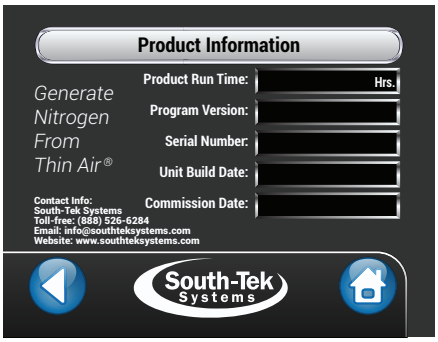



***Figure 22: Product Information Screen***

## 7.8 SYSTEM SETTINGS

There are three menu categories - $N_2$ Pressure Settings, Sensor Calibration, and BlastOff® Settings.

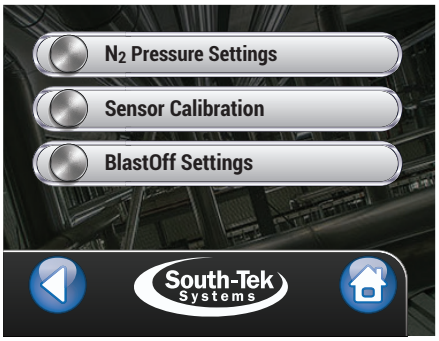



***Figure 22: System Settings Screen***

### 7.8.1 $N_2$ Pressure Settings

The nitrogen generator includes a pressure transducer connected to the nitrogen tank and determines when it needs to run. The controller reads the pressure transducer and uses a cut-in and out point to allow the system to be more energy efficient. When the nitrogen tank reaches the cut-out pressure, the generator goes into a "standby" mode, where it stops the delivery of air to the nitrogen generator. Therefore, the nitrogen production to the tank also stops. The system stays in standby until the nitrogen storage pressure falls to the cut-in pressure. The nitrogen generator resumes separating the oxygen from the compressed air and delivers nitrogen to the storage tank.

***Figure 23: $N_2$ Pressure Settings Screen***

**Note: Adjusting the factory set cut in and cut out settings without contacting South-Tek Systems may alter the nitrogen purity and flow capabilities**

### 7.8.2 Sensor Calibration

The "Sensor Calibration" screen allows the user to calibrate sensors included with the nitrogen generator. Every unit has a nitrogen storage pressure sensor. Optional sensors include: oxygen, air-in pressure, nitrogen dew point, nitrogen flowmeter, and air flowmeter. All sensors are setup with a 2-point linear calibration. To setup the calibration, the user needs two known points. It is best to select two points at opposite ends of the sensor's calibration range.

***Figure 24: Sensor Calibration Options Screen ($O_2$ will show in the presence of $O_2$ Sensor)***

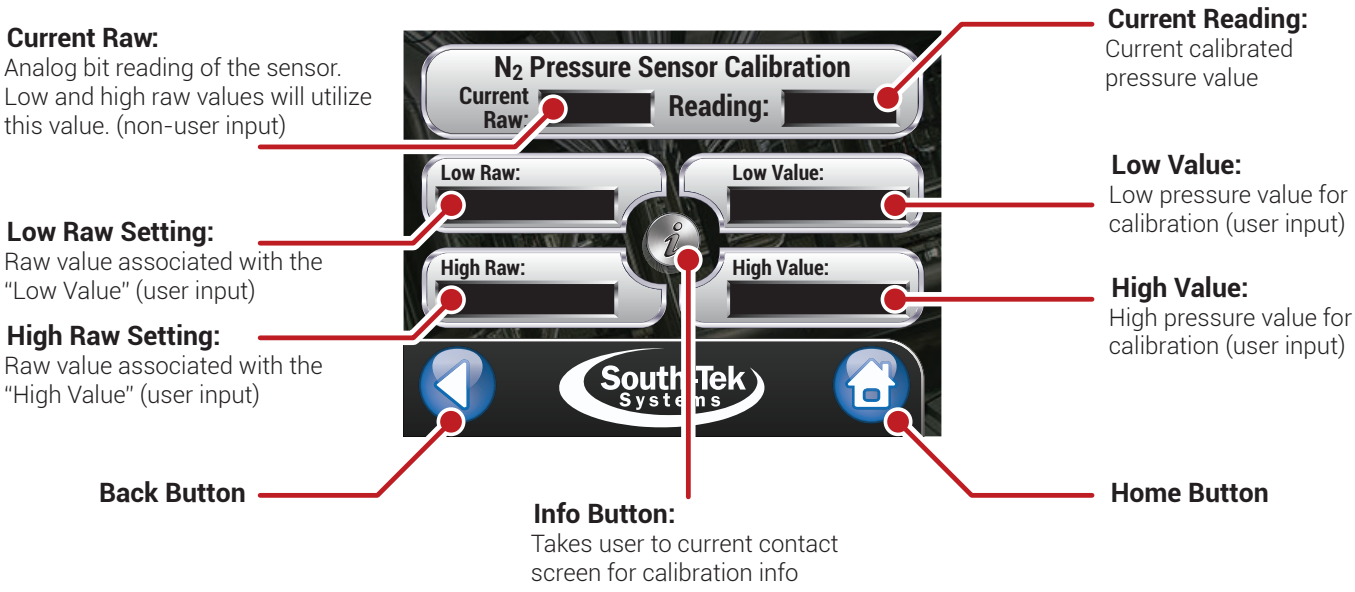



***Figure 25: $N_2$ Tank Pressure Calibration Screen Breakout***

### 7.8.3 Bypass Settings

The system automatically go into bypass mode when the bypass pressure triggers the cut-in pressure. The bypass mode returns to regular run mode when the bypass pressure reaches the cut-off pressure setting. The default cut-in and cut-off settings are 50 and 60 PSIG, respectively. If the bypass air compressor is less than 60 PSIG, set the cut-off pressure 5 PSIG less than the compressor shut pressure. Then set the bypass cut-in pressure to 10 PSIG below the cut-off pressure.

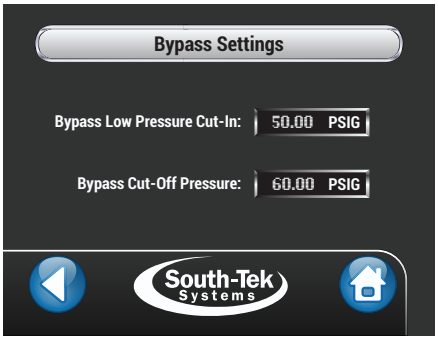



***Figure 26: Bypass Settings Screen***

## 7.9 MAINTENANCE

The "Maintenance Menu" screen allows the user to navigate through the basic categories of system maintenance: Valve Controls, Alarm Contacts and Filters.

***Figure 27: Maintenance Menu Screen***

### 7.9.1 Valve Control

From this screen the user may individually toggle each valve and alarm contact to verify that they are working. It is recommended to have the unit in the "Stopped" mode and the nitrogen outlet valve (from the nitrogen generator) valved off prior to toggling the valves individually. Make sure to reset the valves to "Off" prior to restarting the system.

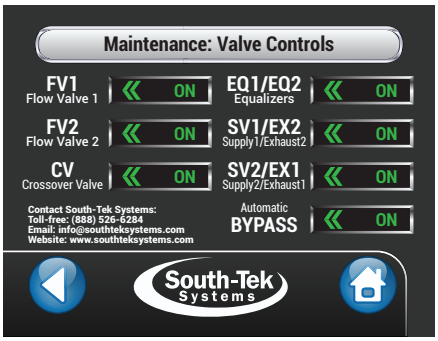



***Figure 28: Valve Control Screen***

### 7.9.2 Alarm Contacts

This screen allows the user to test the electrical contacts and audible signal in the alarm systems. Toggle each contact individually and check for correct wiring.

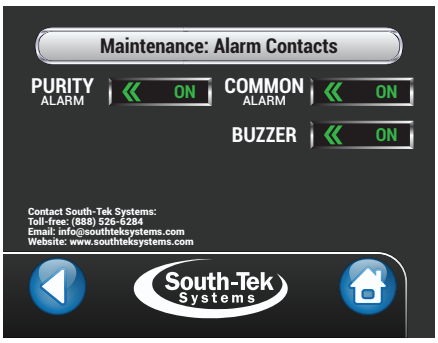



***Figure 29: Alarm Contacts Screen***

### 7.9.3 Filter Maintenance

Equipped with all units is a standard filter set. The FPS-1650 includes an air inlet pre-filter, particulate, and coalescing filter. The FPS-3250 and FPS-5000 includes a particulate, coalescing, and absorber filter. Clean filter elements are important for good performance and longevity of the nitrogen generator. (See Chapter 9: System Maintenance; for step by-step instructions on changing the filters).

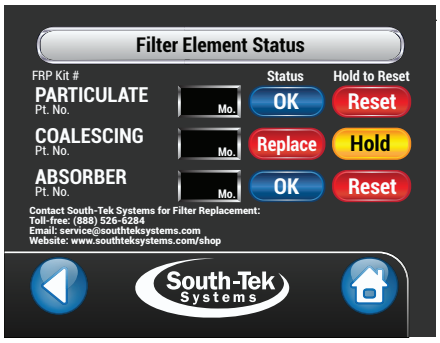


***Figure 30: Filter Maintenance Screens***

## 7.10 ALARM SETTINGS

The nitrogen generator has six alarm categories: General Alarm Settings, Purity Alarm Settings, BlastOff® Alarm Settings, $N_2$ Pressure Alarm Settings, Bypass Alarm Settings, and Equipment Status Alarm Settings. The sub-section details each category.

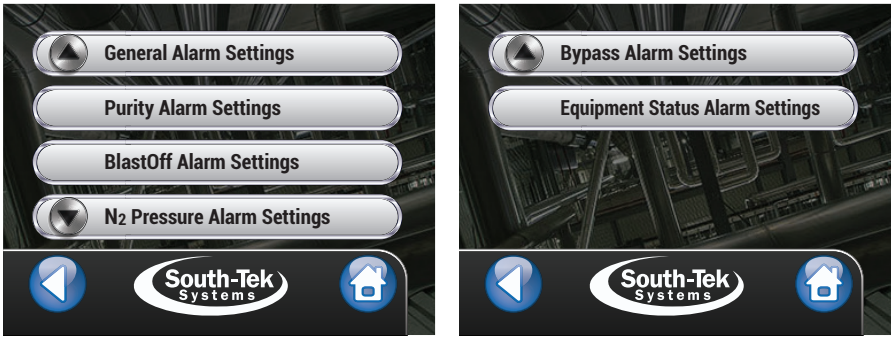



***Figure 31: Alarm Settings Screens***

### 7.10.1 General Alarm Settings

The "General Alarm Settings" screen allows the user to set all alarm buzzers on or off. The "Alarm Buzzer Mute Time" and "Timeout to Op Screen" can be set here. The "Alarm Buzzer Mute Time" is silence time on the alarm audible, and the "Timeout to Op Screen" is how often the operational screen appears when alarming.

### 7.10.2 $O_2$ Purity Alarm Settings (only available with $O_2$ sensor)

The user can set, or change, the Alarm Points and Alarm Cut-Out Points from this screen.

### 7.10.3 BlastOff® Alarm Settings

The user can toggle "On and Off" the BlastOff® System or the BlastOff® Alarm buzzer. The user can set, or change, the BlastOff® timer setting and observe the BlastOff® timer countdown.

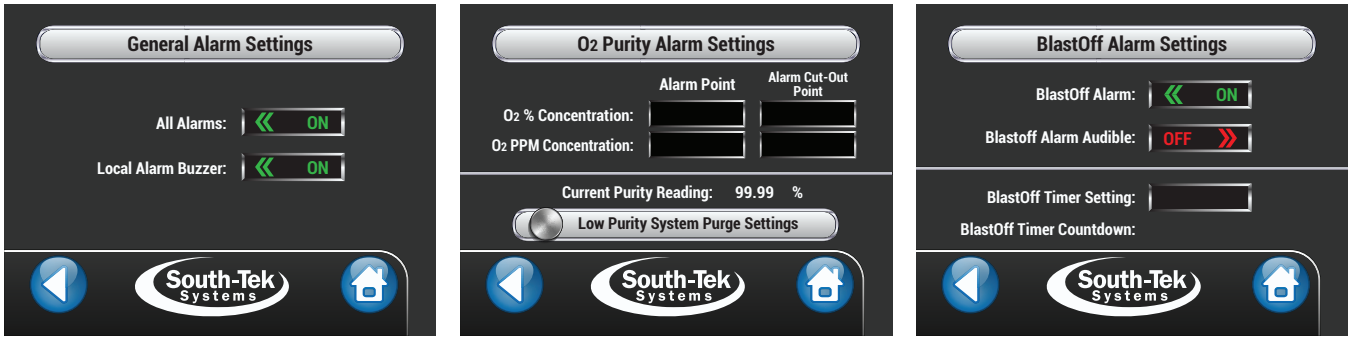



***Figure 32: General Alarm, $O_2$ Purity Alarm, and BlastOff® Alarm Settings Screens***

### 7.10.4 $N_2$ Pressure Alarm Settings

The user can toggle "On and Off" the "$N_2$ Tank Pressure Alarm" or the "Bypass Alarm buzzer". The user can set, or change, the "$N_2$ Tank Pressure Alarm" or "Alarm Cut-out" point.

### 7.10.5 Bypass Alarm Settings

The user can toggle "On and Off" the "Automatic Bypass System" or the "Bypass Alarm buzzer".

### 7.10.6 Equipment Status Settings

This screen allows the user to toggle "On and Off" the Compressor and Dryer contact and audible alarms.

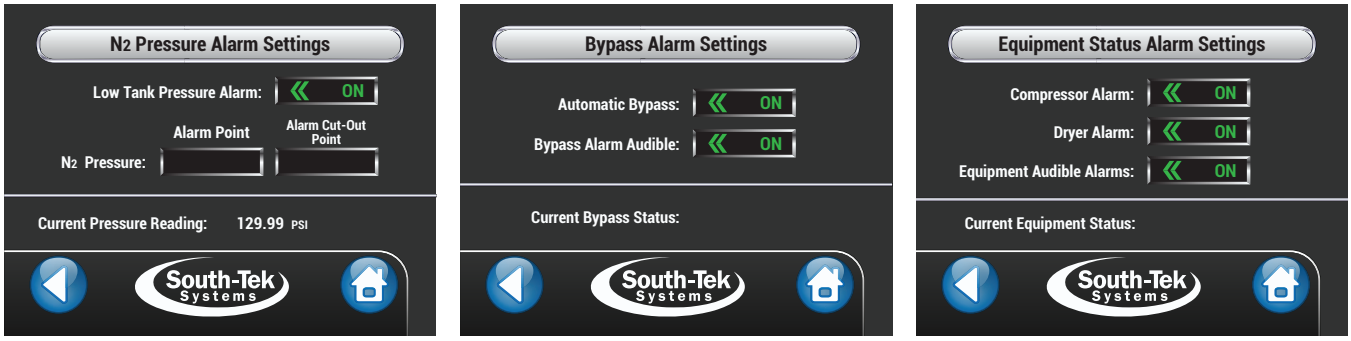



***Figure 33: $N_2$ Pressure, Bypass, and Equipment Status Alarm Settings Screens***

## 7.11 COMMUNICATION SETTINGS

The Ethernet card allows the user communication via TCP/IP. It requires a static IP assigned to the controller, and entered into the controller. Communication within the organization's intranet does not require a subnet and gateway. Press the connect button or power cycle the controller to establish communication. Communication through Ethernet includes Remote Access, SD Card Access, and MODBUS TCP/IP communication. A connection status message indicates a successful connection.

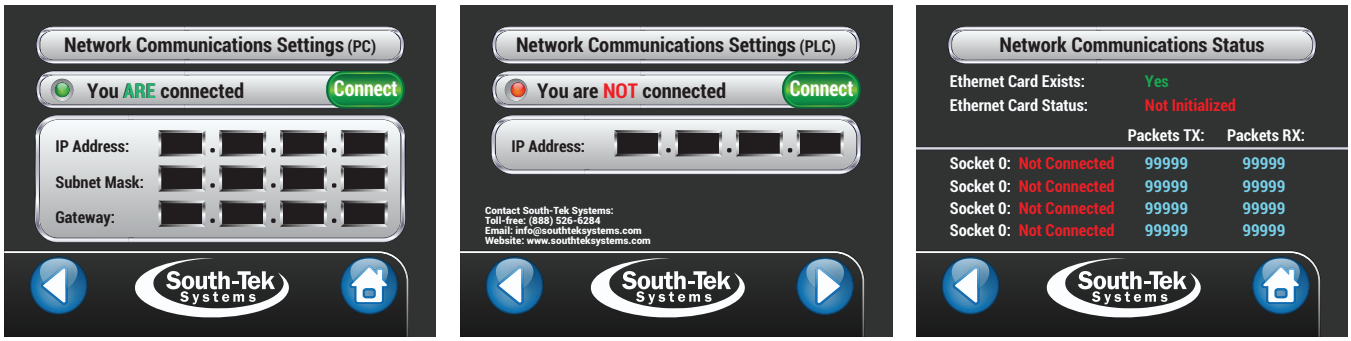



***Figure 34: Communication Settings Screens***

### 7.11.1 Network Communications (PC) Screen

The user manually enters the static IP address, the subnet mask, and the server gateway from this screen. A green or red indicator denotes status of connection.

### 7.11.2 Network Communications (PLC) Screen

The user manually enters the static IP address from this screen. A green or red indicator denotes status of connection.

### 7.11.3 Network Communications Status

The user may view the status of the Ethernet card and network traffic from this screen.

## 7.12 FACTORY SETTINGS

**Note: This section is password protected for South-Tek Systems' Technicians only. Please contact South-Tek Systems for further assistance.**

# 8 START-UP PROCEDURES

## 8.1 START-UP PROCEDURES

It is necessary to use caution when working with pressurized gas, making sure that all fittings and gas lines are installed correctly. Always leak check every line before using the system (see **8.2 Checking for Leaks** section).

**Note: Line leaks will cause the $N_2$-BLAST® to run excessively, shortening its life and possibly causing excessive wear on the compressor.**

The system documentation package comes with an installation layout drawings. For electronic copies, please contact your local distributor. Review and complete the installation the installation layout drawings. Ensure that you follow the correct installation drawing per your system's design. In some cases, a nitrogen bypass system for pre-filling is required to meet code.

If the system requirements are more complex, please consult the sales representative or equipment installer for more detailed instructions.

The following are standard installation instructions:

**Note: The *$N_2$-BLAST®* is supplied with ½" NPT Female inlet and outlet fittings. Make sure to use Teflon tape or similar on all fittings to make sure they don't leak. If an external Air Compressor is connected, make sure to have completed the startup procedures per manufacturing before starting up $N_2$ Generator.**

1. Complete the installation procedures in section 5.
2. Make sure power is on the unit by making sure the touchscreen has turned on and the start and stop button is "Red" and the icon reads "Status: Off".
3. Make sure the outlet ball valve is valve off.
4. Skip this step if this is a FPS-1650, otherwise, slowly open the Air Inlet valve and allow pressure to build up to the internal regulator after the filters. Make sure pressure reaches 120 PSIG. Listen and feel for any major leaks.
5. On the home screen of the touchscreen, press and hold the power button for 2 seconds until it turns "Green" and the icon reads "Status: Running".
   a. Air will rushing through the system and $N_2$ will start filling the tank.
   b. If there is a leak, shut the air inlet valve off and press and hold the stop button. Depressurize the area that is leaking and make the correction.
   c. For internal leaks, remove the cover and find the issue. If you must replace any parts, only use factory parts supplied from your distributor or South-Tek Systems. Consult the factory for other questions.

Cont.

6. Monitor the outlet gauge pressure or read the pressure reading on the touchscreen. Once the internal tank pressure reaches 70 PSIG, the system will go into standby mode (Homescreen Icon will read "Standby") at the end of the cycle.
7. Once the system is in "Standby", take note of the tank pressure. Monitor for the next 5 minutes and make sure there is not a drop in pressure.
8. After the 5 minutes with system, the pressure maintained, slowly open the nitrogen outlet valve to the "Air Maintenance Device" and monitor for any leaks. The nitrogen generator will automatically run and shutoff as needed based on the internal storage tank pressure. Please consult South-Tek System for a different pressure range.

## 8.2 CHECKING FOR LEAKS

The Blast Off® provides early warning alarms for potential leakage. With a suspected leak, first listen for leaks and spray soapy water around the connections. When a leak occurs, isolate the area and relieve pressure before working on it. Fix the leaking part and return the system back to operation. If no leak is heard (or visually seen with the soapy water), turn off the unit and try isolating sections to see if there's a pressure loss. Consult with your installer if you cannot find the leakage area.

### 8.2.1 To determine if the leak is within the Generator to the $N_2$ Storage Tank:

1. With the unit powered on, close off both ball valves on the nitrogen tank. Note the storage tank pressure.
2. Allow the system to continue running. Within 10 minutes or less, the system should reach the "Standby" mode.
3. Wait 5 minutes and if the system remains in "standby" mode, then the leak is after the nitrogen generator. Read the nitrogen tank pressure and if the pressure has changed, the leak is within the storage tank fittings. If the nitrogen tank pressure did not change, check the pipe lines in the building for leaks.
4. Returning to "run" mode indicates the leak is within the cabinet. Check lines back to the tank.

### 8.2.2 To find the leak within the cabinet:

1. Turn off the unit once the nitrogen tank pressure is greater than 60 PSIG.
2. Open the front cabinet door and locate the nitrogen tank.
3. Close off the output ball valve from the tank (upper ball valve on the red manifold).
4. Watch the exterior gauge above the cabinet for 60 seconds. Pressure dropping indicates the leak is between the output ports to storage tank. Feel and listen for leaks and fix once found. If the pressure is not dropping go to the next step.
5. Leave the outlet ball valve off, turn the unit on, and allow the system to go into "Standby".
6. Within 10 minutes, the system should go into "Standby" Mode. If it doesn't, contact your local provider/installer for further assistance.
7. Once in "Standby" mode, wait 5 minutes. After 5 minutes, the system should remain in "standby" mode, otherwise the leak is between the check valve and tank.
8. If the system remains in standby, contact your local provider/installer for further assistance.

# 9 MAINTENANCE

**WARNING: Whenever doing any maintenance to the system, make sure to power down the system. Remove the front cover to gain access to the filters.**

**Note: Annual filter replacement kit part number: FRP-007 for FPS-1650, FRP-006 for FPS-3250 and FPS 5000.**

## 9.1 Air Pre-Filter (For FPS-1650 units only):

The integrated Air Compressor, of the ***$N_2$-BLAST®*** FPS-1650, has an air intake pre-filter. It prevents particles from entering the compressor housing and damaging internal components. This filter needs to be replaced once per year or every 1000 hours, whichever comes first. To do so, remove the pre-compressor filter cap by twisting it clockwise. Remove the old element and use a clean dry cloth to clean the filter bowl before installing the new element.

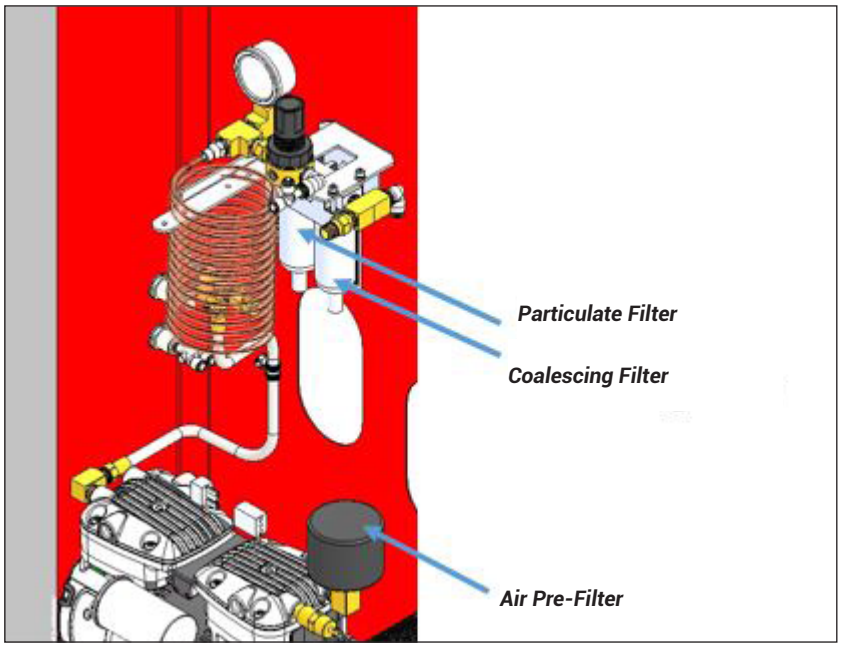



***Figure 35: FPS-1650 Filter Change***

## 9.2 Air Filter Replacement:

The particulate and coalescing filter after the air compressor captures particulate and moisture before entering the rest of the system. These filters need to be replaced once per year or every 1000 hours, whichever comes first. To do so:

1. Stop the unit by holding down the Start/Stop button on the home screen until it Icon shows "Off". For the FPS-3250, make sure to also valve the air inlet valve off.
2. Locate the air filters on the bracket in the middle of the cabinet. See ***Figure 36***.
3. Depressurize the filters completely:
   a. FPS-1650 automatically depressurizes when the system stopped (pressure gauge after the copper coil will read 0).
   b. FPS-3250: locate the air service valve after the regulator and slowly open to relieve pressure on the regulator to 0 PSIG. Leave air service valve open for now.
4. Remove the Filter Bowls:
   a. FPS-1650: Remove two filter bowls. Do so by turning them counter clockwise.
   b. FPS-3250: Remove three filter bowls. Press the bowl's front clip, twist a quarter turn, and pull down. (Tip: Push the clip and push upward if bowl is difficult to turn).
5. After removing the filter bowls, rinse debris out of the bowls with warm water.
6. Dry the bowls with a clean dry cloth and replace old O-rings with the ones with the kit.
7. Change the filter elements:
   a. Particulate Element - Pull the plastic element housing out of the filter bowl. Twist off the black plastic cover and pull off the particulate element. Install the new element in the reverse order.
   b. Coalescing Element - Twist the coalescing element counter-clockwise. Install the new element in the reverse order.
8. After replacing all elements and O-rings and cleaning the bowls, install the bowls back to their corresponding filter housings.

After replacing the filters, reset the filter alarm on the touchscreen (see **7.6.1 Filter Alarm**). Put front cover back on and power on the unit. Once powered up, the air compressor will turn on and start producing nitrogen. Check the filter bowls for leaks.

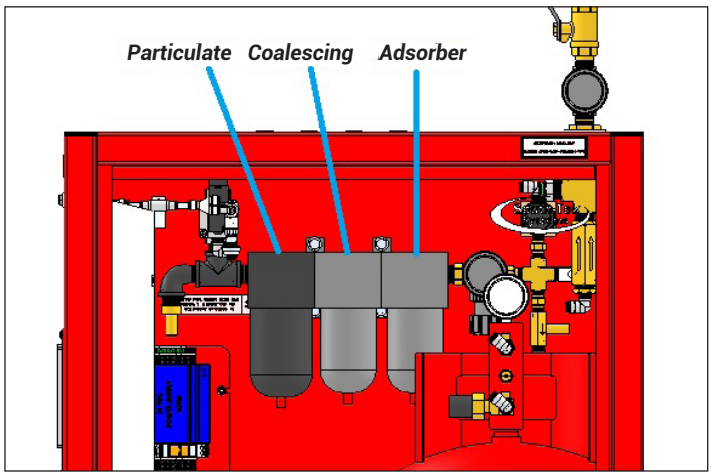



***Figure 36: Filter Bowls***

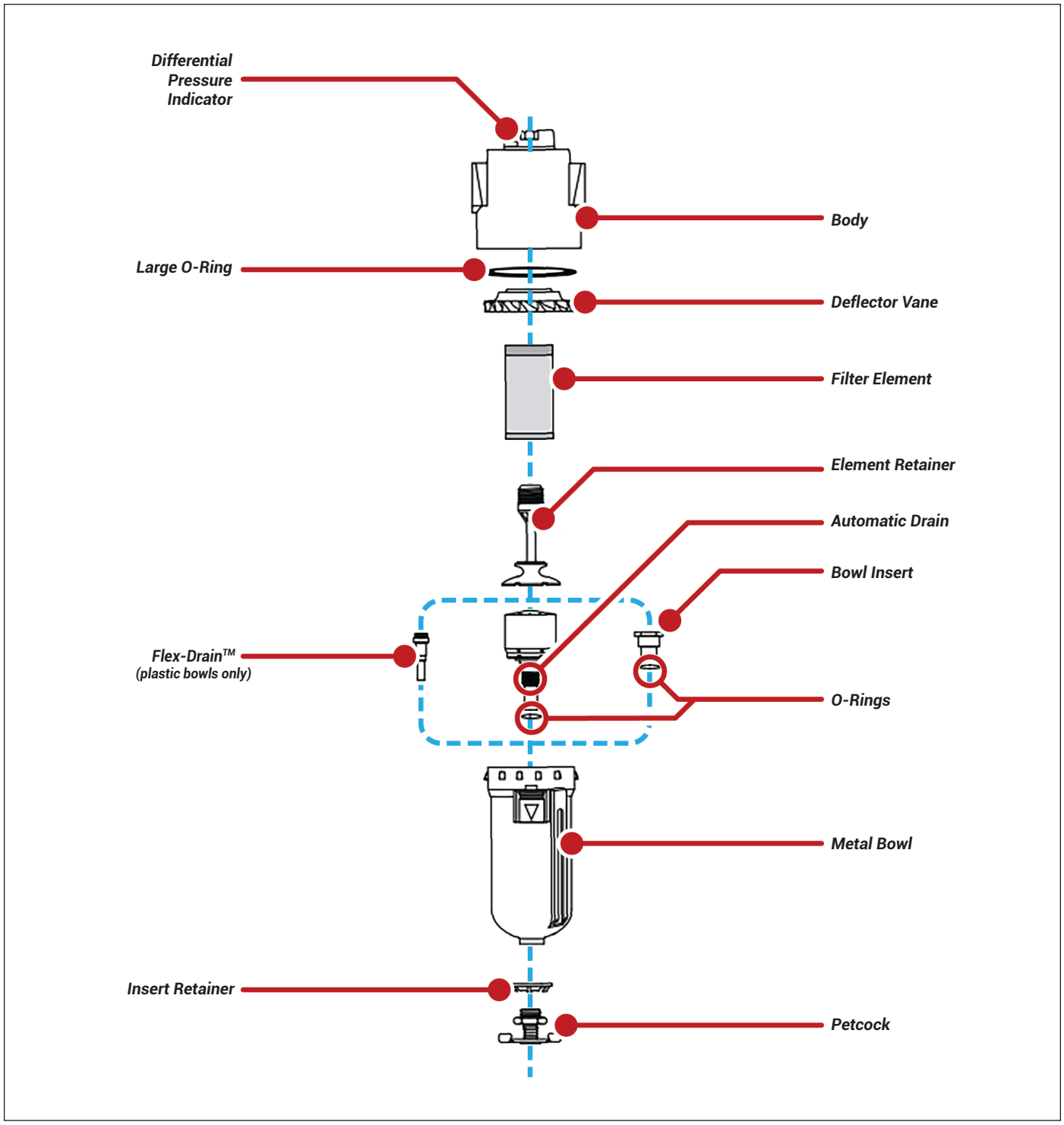



*Figure 37: Filter Diagram with internal components (for FPS-3250 and FPS-5000 units)*

# 10 KEY CONTACTS

Contact your local provider/installer for any questions about the performance and/or maintenance of the system. They will be best suited to answer your questions and your quickest solution on any issues you may have.

If they can not be reached, contact the manufacturer at:

South-Tek Systems, LLC.

tel (888) 526-6284 fax (910) 332-4178

Email: info@southteksystems.com

# 11 FAQS

## 11.1 POWER ISSUES

If the ***$N_2$-BLAST®*** FPS-1650, FPS-3250, & FPS-5000 do not have power, the production and storage of nitrogen will become apparent once the storage pressure drops.

1. Check the power cord.
2. Has building's circuit breaker or GFCI tripped? Locate the breaker and reset. If breaker continues to trip, you may have that circuit overloaded.

## 11.2 PRESSURE ISSUES

The ***$N_2$-BLAST®*** FPS-1650, FPS-3250, & FPS-5000 will produce and store nitrogen. Once the nitrogen storage reaches the cut-out pressure setting, the system goes into "Standby Mode". When the pressure drops down the cut-in pressure setting, the system goes into "Run Mode" and begins refilling the storage. Troubleshoot for component failures or leakage if the system does not meet specifications. Contact the manufacturer or factory trained technician.

**Nitrogen Pressure Check:**

The pressure gauge on the top of the cabinet should be between 50 and 100 psig.
If the pressure is low, check the following:

- Check the power.
- Check if fire protection system is being tested.
- Check leaks throughout system. Refer to section "Checking for Leaks".

## 11.3 GAS LEAKS

As with any gas system, only use a spray bottle on non-electrical equipment to find leaks. Fix or replace leaking fittings or old hose. Push-to-connect fittings will show bubbles and typically have up to a 5ccm acceptable leakage rate. Contact your local provider/installer for help.

## APPENDIX A: WARRANTY

The ***$N_2$-BLAST®*** FPS-1650, FPS-3250, & FPS-5000 systems are warrantied against any defects in workmanship and materials for 12 months (or 1000 hours) from the date of shipment from South-Tek Systems, whichever comes first. The purchaser has the liability to ensure that the system is fully inspected upon delivery and shall contact the appropriate shipping company to make any claims on damaged goods due to transit within that shipping company's policies. If the system is received with defects that are not due to shipping, a written claim should be submitted to South-Tek Systems within 1 week of receiving the shipment. South-Tek Systems can deny all other claims at their discretion. All warranty work shall be done at a South-Tek Systems facility or at a FPS-1650, FPS-3250, & FPS-5000 Authorized Service Center. Only factory trained and authorized personnel are covered under warranty. Any part that is returned/repaired/replaced under warranty may be remanufactured or changed to a different specification at the factory's option. Any work performed by an unauthorized person/company or usage of non-factory parts, may void all warranties to the product. Any item not manufactured by South-Tek may carry its own warranty from its manufacturer and will be warrantied by that manufacturer. All parts that need to be returned should be announced. Any item(s) that is returned to South-Tek Systems without an RMA number (return authorization number) may be denied and returned to the sender. Contact the factory for RMA #'s, prior to return shipment. South-Tek Systems is not liable for damages caused by normal wear and tear, water, fire, erosion, corrosion, explosion, misuse, oil/gas vapors or unauthorized modifications. South-Tek Systems is also not liable for any losses (including CO2), damages, or cost of delays, including incidental or consequential damages. There are no warranties or guarantees, expressed or implied, including the warranties of merchantability or fitness for a particular purpose or use, other than those warranties expressed herein.

For Claims, contact South-Tek Systems, LLC. at:

tel (888) 526-6284 fax (910) 332-4178

Email: info@southteksystems.com

Or write to:

South-Tek Systems, Warranty Claims,
2940 Orville Wright Way, Wilmington, NC 28405